Additive Monitoring System

User Manual

REVISION: 0

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1.0 Functional Overview

The system monitors fuel additive use on each loading bay for road tanker loading fuel terminals.

It provides control room operator access to each PCM additive injector controller installed on the loading bays, monitors additive usage, and provides additive inventory reports.

The system compares the additive volumes from the pump flow meters and additive controllers on the loading bays. It generates deviation alarms if there is a difference between the flow totals measured from the pump flow meters and the additive controllers on the bays. If the deviation between the two measurements are significant enough, indicating a leak, the system disables the related additive pump.

The system supports loading bays controlled by both spectra-tek systems and acculoads simultaneously.

Pump control, hardwired alarms, and data communications to the loading bays is all done in the control panel using a Honeywell HC900 logic controller.

The user interface to the system is done using an operator station PC running a stand alone version of the Honeywell Experion PKS SCADA package. This is usually located in the control room, which connects to the system logic controller over a dedicated network.

2.0 System Overview

The user interface has a standard web page style layout, with a main menu, a top navigation bar with forward and backward buttons, and each page has links to other related pages.

2.1 System Start-up

Ensure the control panel is powered on, then press the power button on the operator station PC.

The PC automatically logs into the operator windows account, and starts the necessary processes.

Once the operating system has logged in, it takes between 30 – 60 seconds to carry out database checks and starts the required operating system and server services. While this is done a message is displayed on the screen as follows:

```
**************************************

Starting Operator Station - Please Wait

**************************************
```

The user interface then starts, and the system is ready for use.

2.2 System Shutdown

To shut down the PC, press alt-ctrl-del together, and select 'shutdown'. The only two options available in the operator windows account are 'shutdown' and 'logoff'.

Other parts of the windows operating system including the start menu are not available in the operator windows account.

If the operator account is logged off for any reason, it can be logged back in using the following:

User name: oper
Password: password

2.3 Log-on and user access

There are four levels of user access on the system:

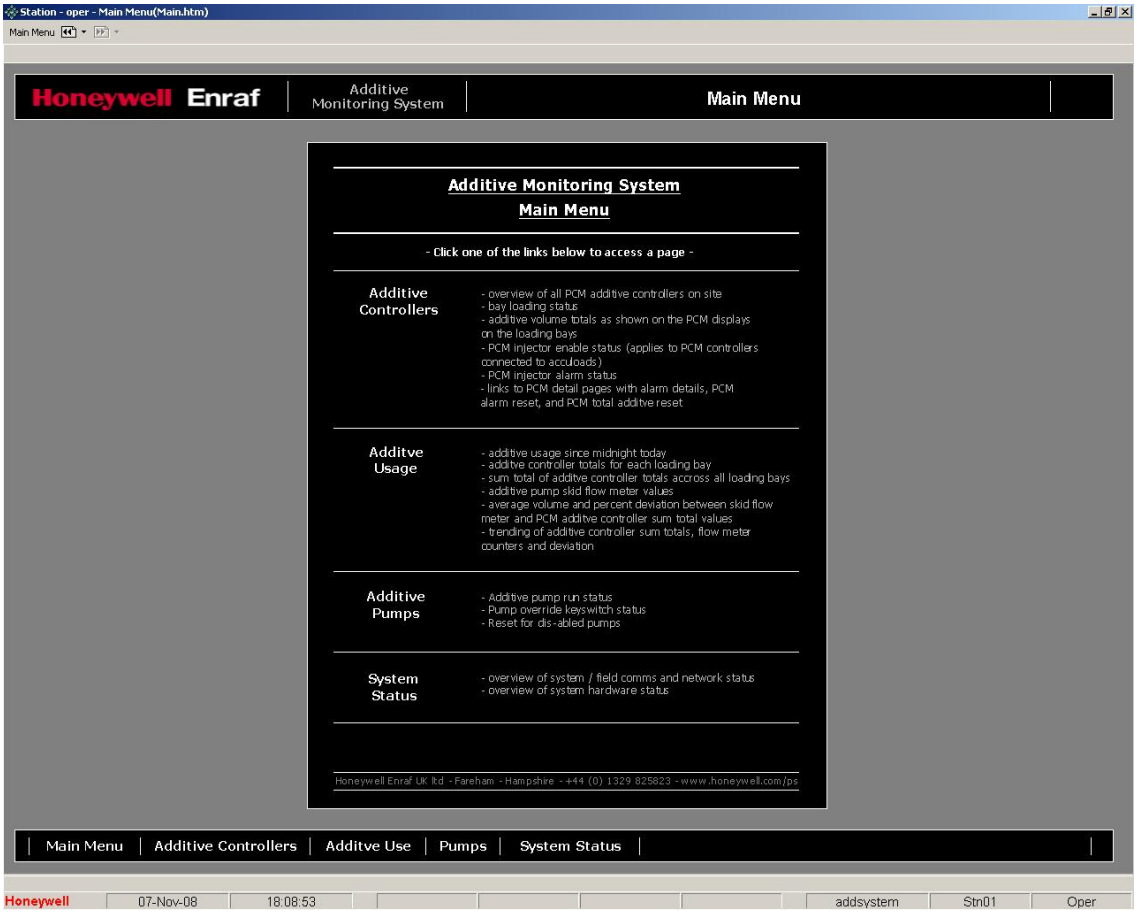
1. Operator (p/w = 'oper')
2. Supervisor (p/w = 'supv')
3. Engineer (p/w = contact Honeywell Enraf)
4. Manager (p/w = contact Honeywell Enraf)

The operator user access is automatically logged on at startup, all other access levels auto logout back to operator level after 10mins from last keyboard / mouse action.

Refer to section 3.3 for how to log in.

3.0 User Interface

3.1 Main Menu


Station - oper - Main Menu(Main.htm)
Main Menu
Honeywell Enraf
Additive Monitoring System
Main Menu
Additive Monitoring System
Main Menu
- Click one of the links below to access a page -
Additive Controllers
- overview of all PCM additive controllers on site
- bay loading status
- additive volume totals as shown on the PCM displays on the loading bays
- PCM injector enable status (applies to PCM controllers connected to acculoads)
- PCM injector alarm status
- links to PCM detail pages with alarm details, PCM alarm reset, and PCM total additive reset
Additve Usage
- additive usage since midnight today
- additive controller totals for each loading bay
- sum total of additve controller totals accross all loading bays
- additive pump skid flow meter values
- average volume and percent deviation between skid flow meter and PCM additive controller sum total values
- trending of additive controller sum totals, flow meter counters and deviation
Additive Pumps
- Additive pump run status
- Pump override keyswitch status
- Reset for dis-abled pumps
System Status
- overview of system / field comms and network status
- overview of system hardware status
Honeywell Enraf UK ltd - Fareham - Hampshire - +44 (0) 1329 825823 - www.honeywell.com/ps
Main Menu
Additive Controllers
Additve Use
Pumps
System Status
Honeywell
07-Nov-08
18:08:53
addsystem
Stn01
Oper

The main menu is displayed after a system start-up, and can be accessed from the top navigation bar. It has access to the two main parts of the system:

Additive Controllers	Access to each additive injector controller on the loading bays, showing the same information shown on the additive controller local displays including; total injected volume, Injector alarm and enable status.
Additive Usage	The daily and gross sum totals of all injected volumes for each additive, and a comparison against the flow meter readings for each additive pump.

There are also links to the pump status page, showing pump enable status. And the system status page showing diagnostic information for the system.

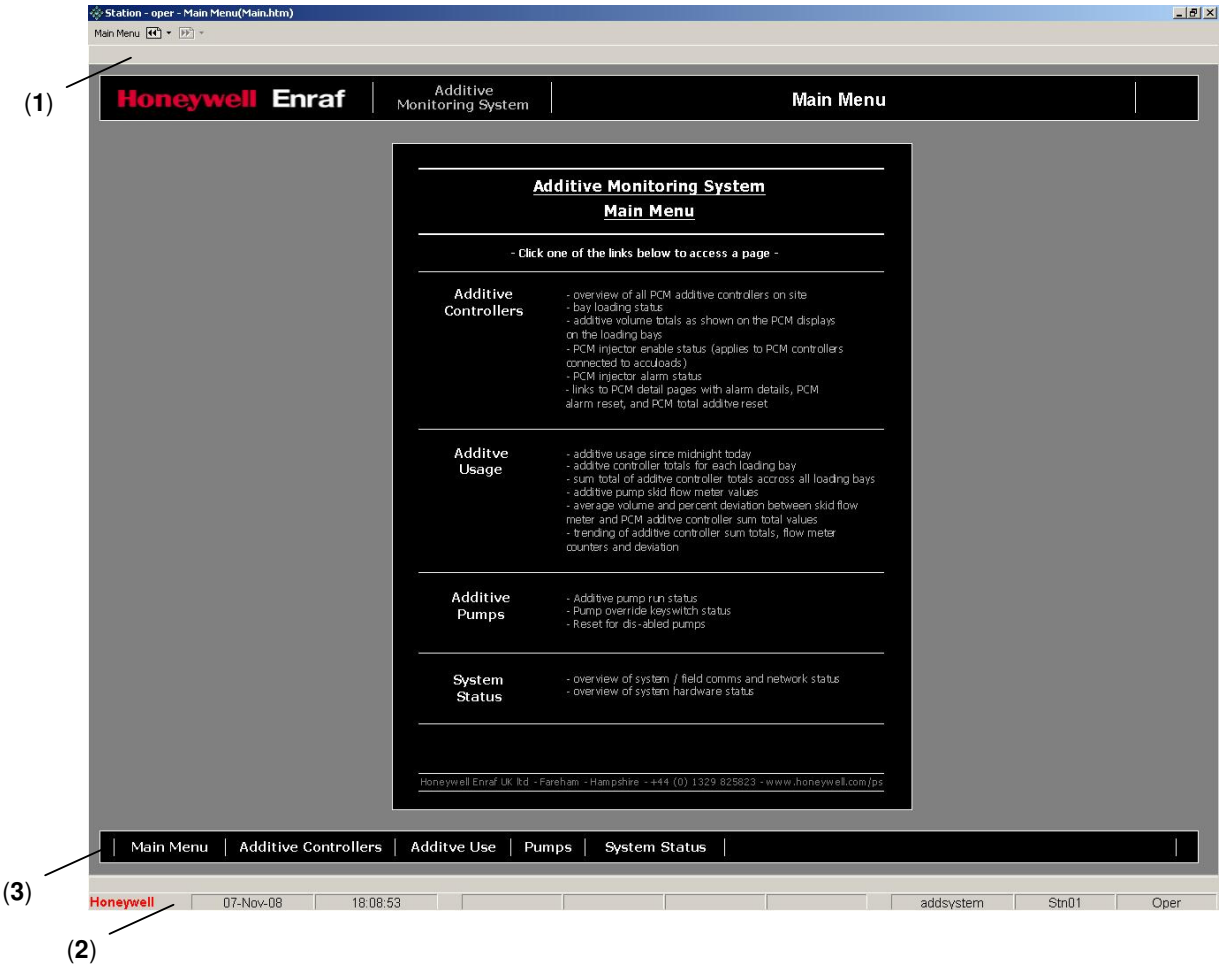
3.2 Navigation

There are three methods to navigate around the system:

(**1**) Top navigation bar

(**2**) Bottom navigation bar

(**3**) Page navigation bar


(1)
Station - oper - Main Menu(Main.htm)
Main Menu
Honeywell Enraf
Additive Monitoring System
Main Menu
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Main Menu
- Click one of the links below to access a page -
Additive Controllers
- overview of all PCM additive controllers on site
- bay loading status
- additive volume totals as shown on the PCM displays on the loading bays
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- PCM injector alarm status
- links to PCM detail pages with alarm details, PCM alarm reset, and PCM total additive reset
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- average volume and percent deviation between skid flow meter and PCM additive controller sum total values
- trending of additive controller sum totals, flow meter counters and deviation
Additive Pumps
- Additive pump run status
- Pump override keyswitch status
- Reset for dis-abled pumps
System Status
- overview of system / field comms and network status
- overview of system hardware status
Honeywell Enraf UK ltd. - Fareham - Hampshire - +44 (0) 1329 825823 - www.honeywell.com/ps
Main Menu | Additive Controllers | Additve Use | Pumps | System Status
(3)
Honeywell
07-Nov-08
18:08:53
addsystem
Stn01
Oper
(2)

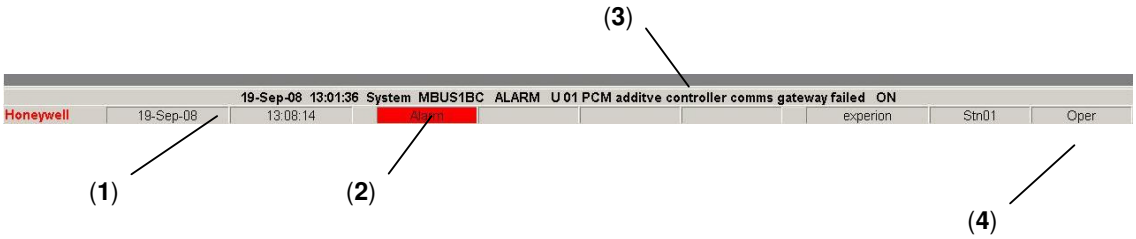
The top and bottom navigation bars (**1**) & (**2**) are always visible have the same appearance through out the system.

The page navigation bar (**3**) is visible on all pages except the alarm viewer, it has links relevant to the current page being displayed, and changes from page to page.

(1) Top navigation bar

The top navigation bar has a main menu access button, and has forward and backward page buttons which operate in the same way as a standard internet web page browser such as internet explorer.

(2) Bottom navigation bar



The bottom navigation bar shows alarm information, has access to the alarm viewer, and allows operator login.

(**1**) System date & time

(**2**) Alarm status

(**3**) Most recent alarm

(**4**) Operator login

Alarm Status & Most recent alarm

The Alarm Status box (**2**) flashes when alarms are present and an-acknowledged in the alarm viewer, it stays on when alarms are acknowledged but still present. It is not visible when there are no alarms, or when acknowledged alarms clear.

The alarm viewer is accessed by clicking on the alarm status box (**2**), refer to section 3.4 for details on the alarm viewer.

The most recent alarm (**3**) is displayed at the top of the bottom navigation bar in bold text.

The operator login box (**4**) shows the current user access level logged in.

3.3 Operator Login

To login, click the operator login box. You need to login with supervisor access level or higher, to do any control actions on the system, such as resetting injector controller alarms, and resetting additive deviation & disabled pumps.

When you click the operator login box the following box appears:

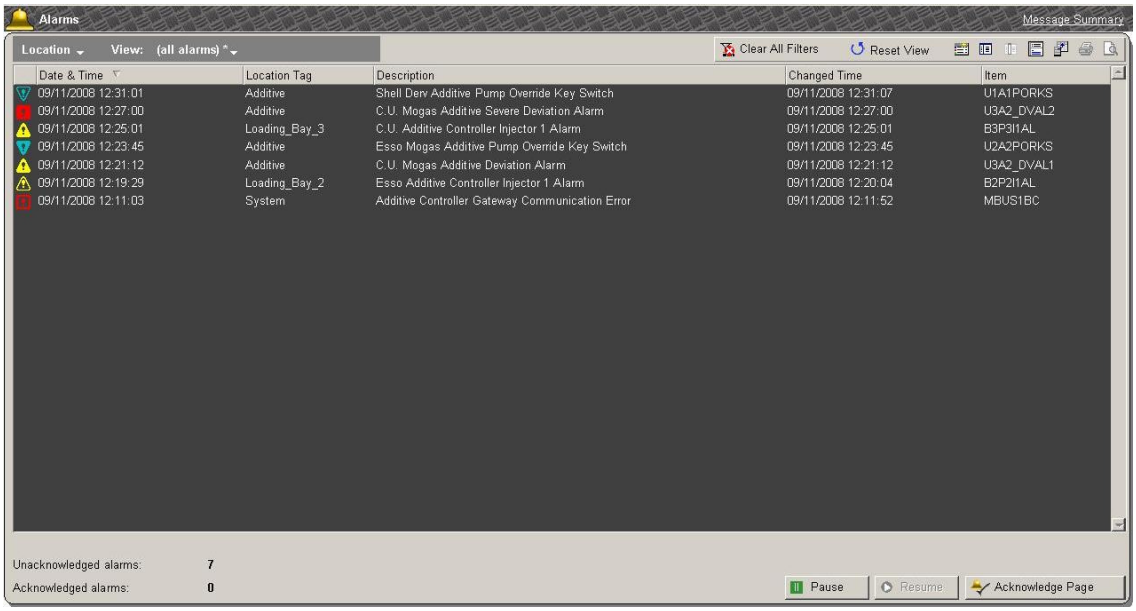
Type in the password for the required user access level, and press enter, or click OK.

The default password for supervisor access level is ‘supv’.

To logout back to operator access level, enter the default password ‘oper’.

For engineer and manager level passwords please contact Honeywell Enraf.

3.4 Alarm Viewer


Alarms
Message Summary
Location
View: (all alarms) *
Clear All Filters
Reset View
Date & Time
Location Tag
Description
Changed Time
Item
09/11/2008 12:31:01 Additive Shell Derv Additive Pump Override Key Switch 09/11/2008 12:31:07 U1A1PORKS
09/11/2008 12:27:00 Additive C.U. Mogas Additive Severe Deviation Alarm 09/11/2008 12:27:00 U3A2_DVAL2
09/11/2008 12:25:01 Loading_Bay_3 C.U. Additive Controller Injector 1 Alarm 09/11/2008 12:25:01 B3P3I1AL
09/11/2008 12:23:45 Additive Esso Mogas Additive Pump Override Key Switch 09/11/2008 12:23:45 U2A2PORKS
09/11/2008 12:21:12 Additive C.U. Mogas Additive Deviation Alarm 09/11/2008 12:21:12 U3A2_DVAL1
09/11/2008 12:19:29 Loading_Bay_2 Esso Additive Controller Injector 1 Alarm 09/11/2008 12:20:04 B2P2I1AL
09/11/2008 12:11:03 System Additive Controller Gateway Communication Error 09/11/2008 12:11:52 MBUS1BC
Unacknowledged alarms: 7
Acknowledged alarms: 0
Pause
Resume
Acknowledge Page

Alarms are shown in the alarm viewer until acknowledged, or if acknowledged but not cleared.

There are three severity levels of alarm; Urgent severity, high severity and low severity. The alarm icon on the far left shows the severity level, a red square is urgent, a yellow triangle is high, and a blue triangle is low.

The severity icons are filled in for present alarms, and change to hollow for when the alarm condition clears and is unacknowledged.

To acknowledge an alarm, right-click the alarm and select acknowledge. To acknowledge all alarms, click the ‘Acknowledge Page’ button on the bottom right of the page.

High and Urgent alarms trigger an alarm relay in the system control panel which controls an alarm window on the control room annunciator.

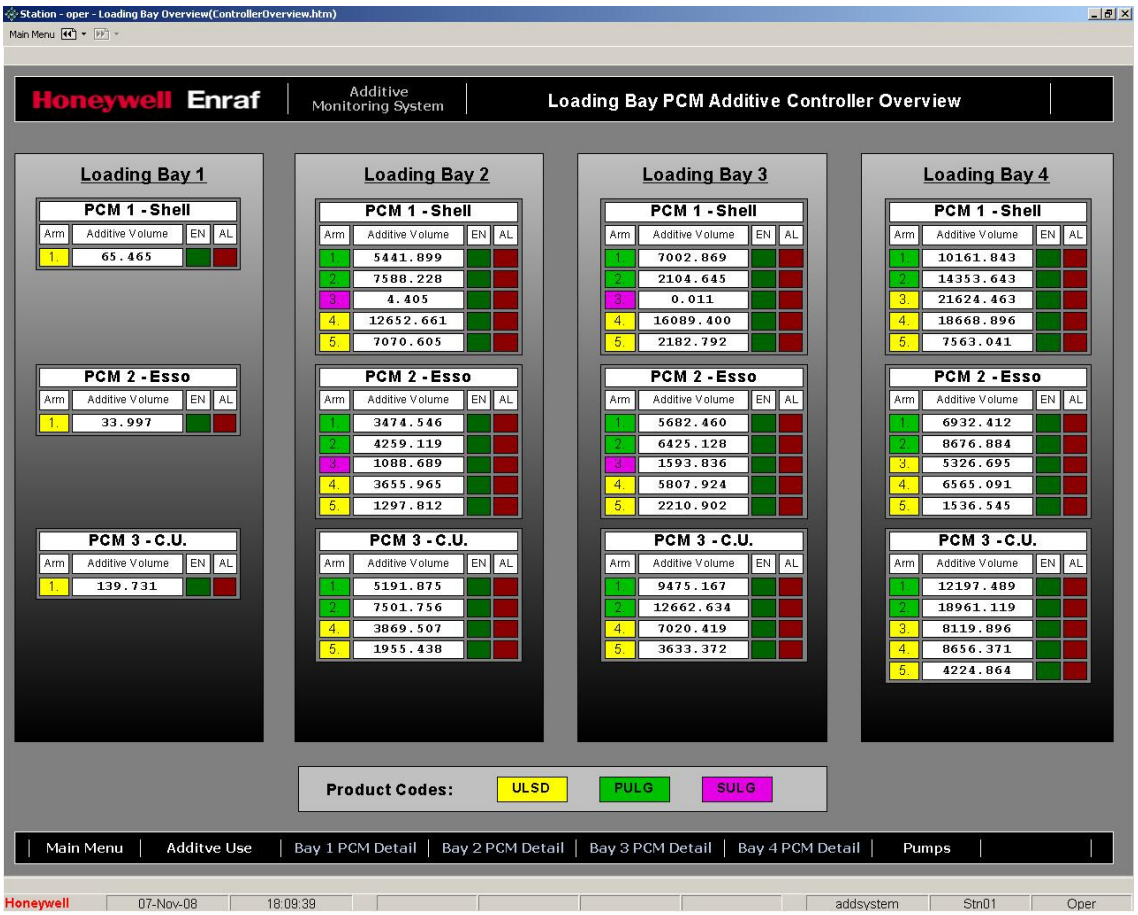
3.5 Alarm & Event History

All alarms & events are automatically archived on the system and can be accessed at any time using manager user access level.

To access the alarm & event history, navigate to the main menu and login using the manager access password. A link then appears on the screen, click on the link to view the history.

4.0 Additive Injector Controllers

4.1 Overview Screen



This screen shows all additive controllers in the fuel terminal.

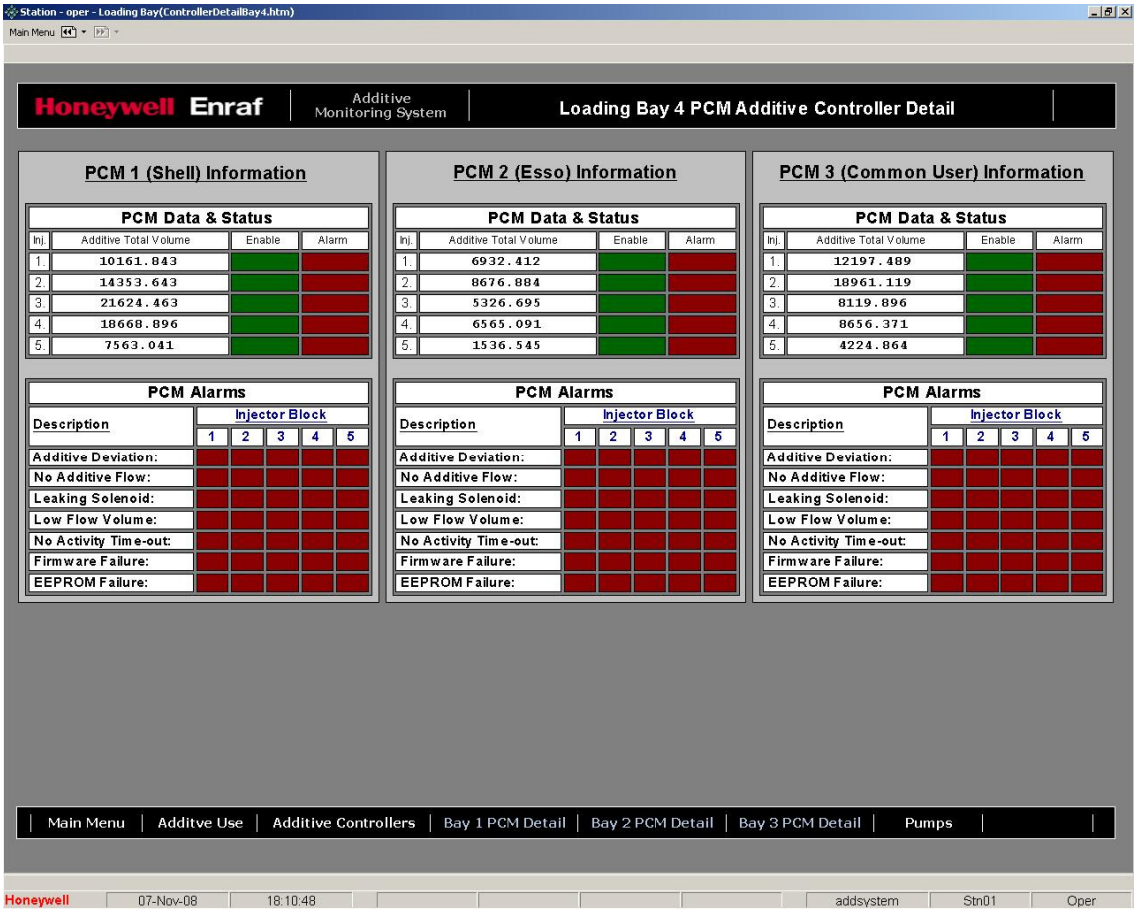
Additive totals for each controller injector are displayed, injector enable and alarm status is shown with green and red indicators.

The injector enable indicators are only used when the additive controllers are connected to accuload units. The spectra-tek system does not support injector enable flags.

Page navigation bar links:

- *Main Menu*
- *Additive Use overview*
- *Additive controller bay detail (bays 1 to 4)*
- *Pump Status*

4.2 Bay Detail Screen



This screen shows the same information as the overview screen for the selected loading bay.

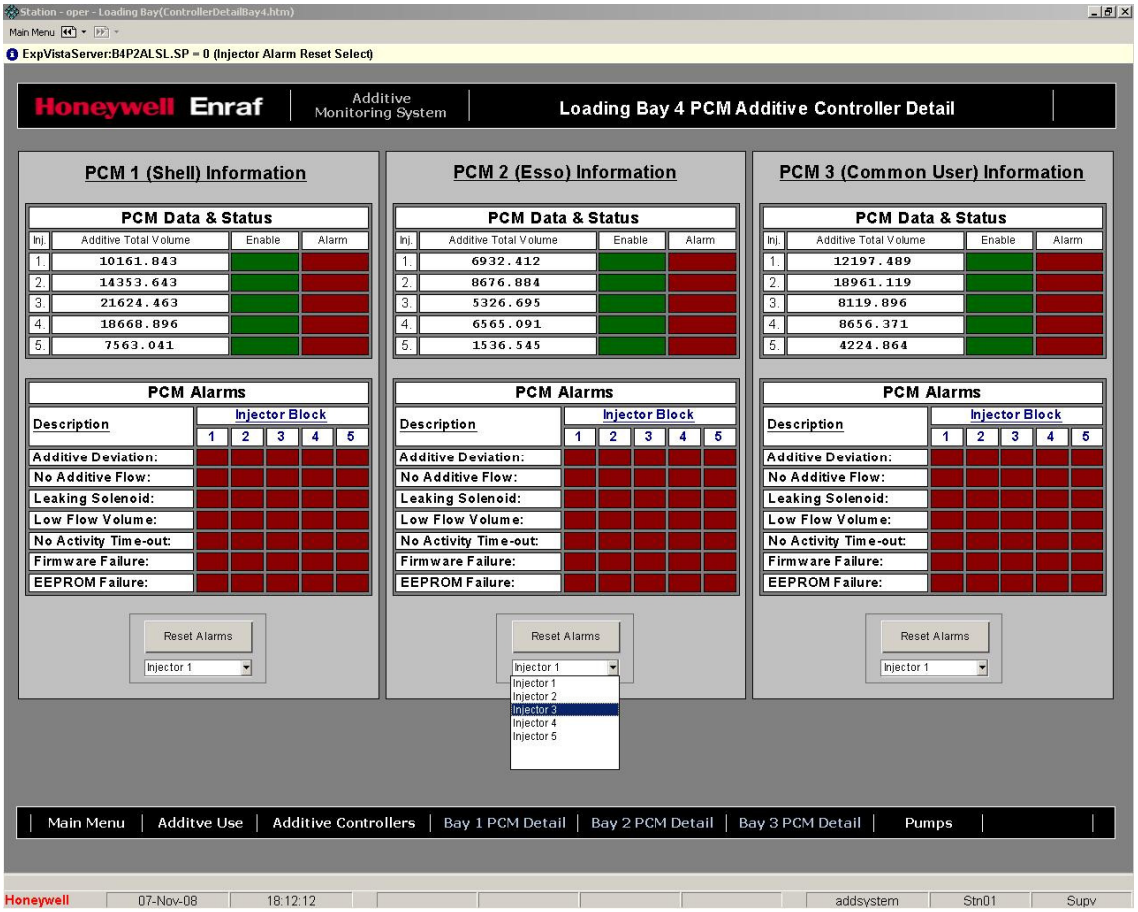
When a controller alarm is present, the injector(s) in alarm and the alarm description is shown in the lower alarm matrix panel (PCM Alarms). All alarms currently available from the additive controllers are supported.

Alarms can be reset in the same way as using the remote control local to the additive controllers on the loading bay.

Page navigation bar links:

- *Main Menu*
- *Additive Controllers overview*
- *Additive Use overview*
- *Additive controller bay detail (bays 1 to 4)*
- *Pump Status*

4.3 Controller Alarm Reset



To reset an injector in alarm, login with supervisor or higher access level. The alarm reset buttons and injector select drop down boxes then appear.

To reset an injector alarm; Select the injector in alarm in the drop down box and click reset alarms.

A confirmation dialog then appears:

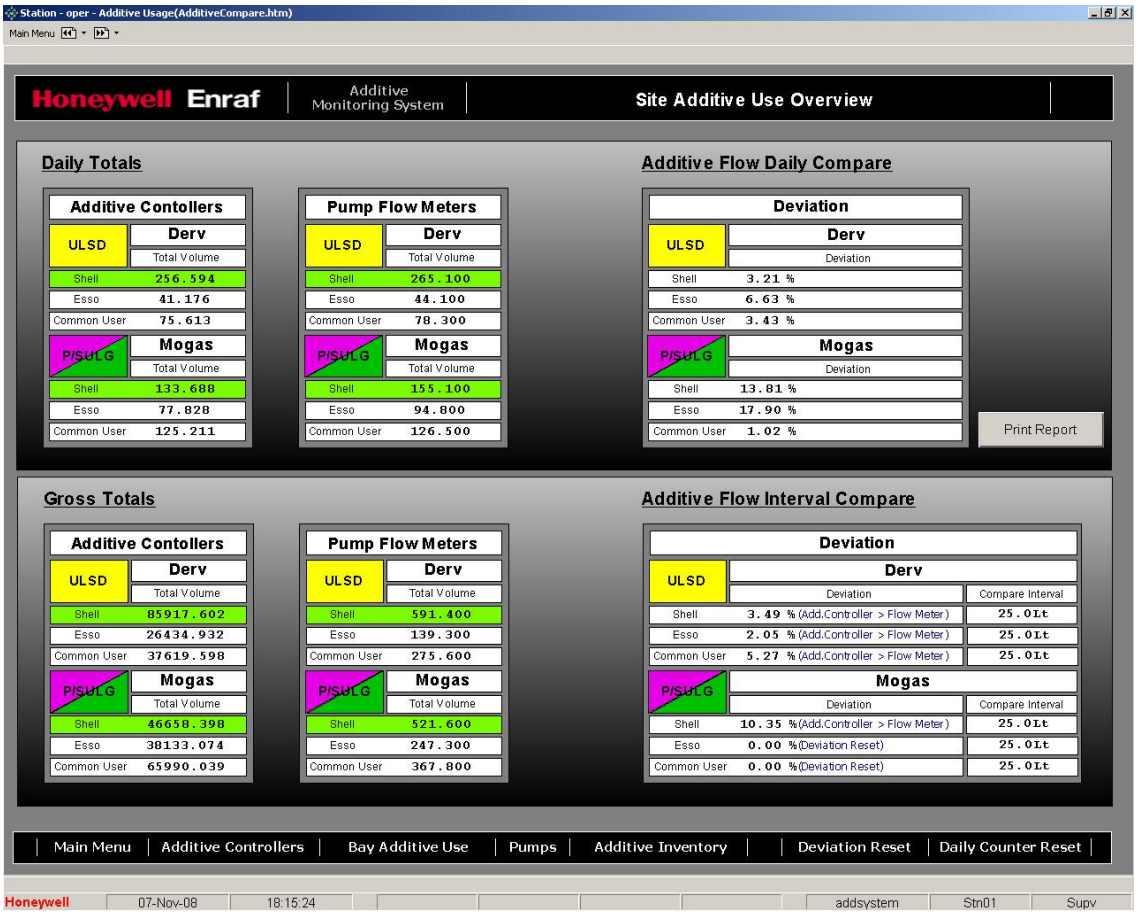
VBScript: Alarm Reset
This will send a command to the PCM additve controller to reset all alarms for the selected injector. Are you sure?
Yes
No

Click yes to send to reset alarms command to the additive controller. An acknowledge dialog box then appears confirming the action.

It takes between 15-20 seconds for the alarm to reset in the additive controller and the alarm indicators to clear on the page.

5.0 Additive Use & Comparison

5.1 Overview Page



This pages shows all additive usage in the fuel terminal. It shows the sum total of all additive controller injected volumes, and pump flow meter volumes for the various additives. The deviation between additive controller and flow meter volumes is also displayed.

The page is split in two sections; daily totals which automatically reset to zero at midnight every day, and gross totals which never reset.

Additives in use are highlighted in green, this indicates that the pump enable output from the system control panel is on for the related additive, providing the pump control system is healthy, the pump should be running.

To print off the daily total additive report, click the ‘Print Report’ button on the page. Refer to section 7 for more on additive reports.

The gross total section shows the deviation interval comparison which is used to control the additive pumps.

The interval comparison is done for every 25lts of additive controller injected volume. If the deviation is between 10% and 60% a deviation alarm is triggered for the related additive. These parameters are default settings and can be changed with Engineer user access level, contact Honeywell Enraf for more information

If the deviation alarm occurs three consecutive times, the pump is disabled. If a deviation of 60% or more is detected, a severe deviation alarm is triggered, and the pump is disabled.

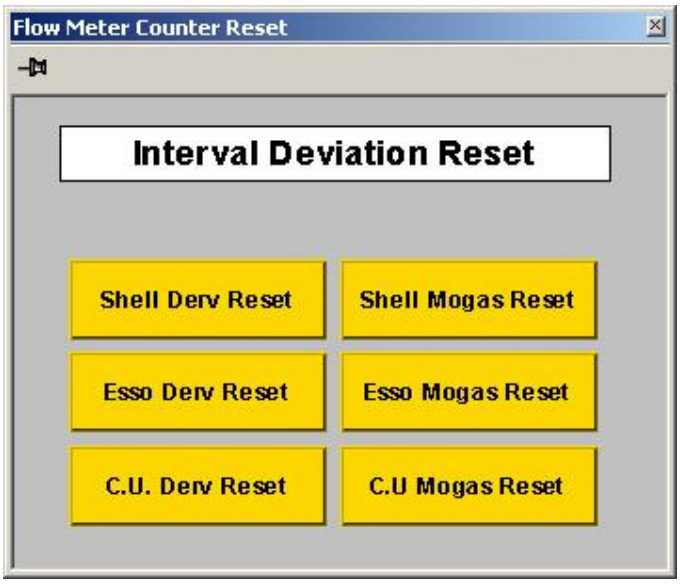
Page navigation bar links:

- *Main Menu*
- *Additive Controllers overview*
- *Additive Use Bay Detail*
- *Pump Status*
- *Additive Inventory*
- *Deviation Reset (password protected pop-up)*
- *Daily Counter Reset (password protected pop-up)*

5.2 Deviation & Disabled Pump Reset

If a pump is disabled it can be reset by resetting the deviation. The deviation can also be reset before a pump is disabled.

To reset a deviation, login as supervisor or higher user access level. The 'Reset Deviation' link then appears on the right of the page navigation bar. When the link is clicked the following pop-up window appears:



Click on the relevant button to reset the deviation, a confirmation dialog box appears the same as with the additive controller alarm reset (refer to section 4.3). Click yes to reset the deviation. An acknowledge dialog box then appears and the deviation (and related pump if disabled) is reset. Click the top right 'x' to close the pop-up window.

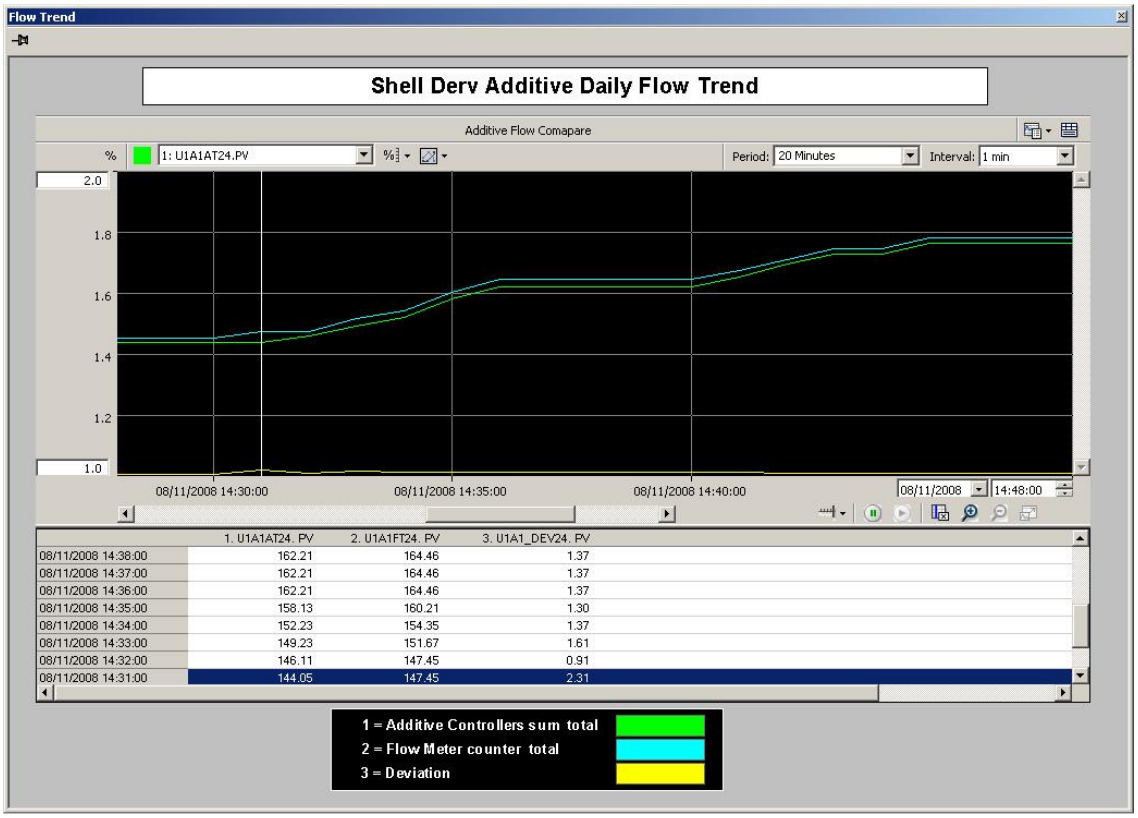
5.3 Daily Totals Reset

The daily totals can also be manually reset. Follow the same procedure as the deviation reset, except click the 'Daily Counter Reset' link on the page navigation bar. This may be done during maintenance on the additive, for example.

5.4 Trending

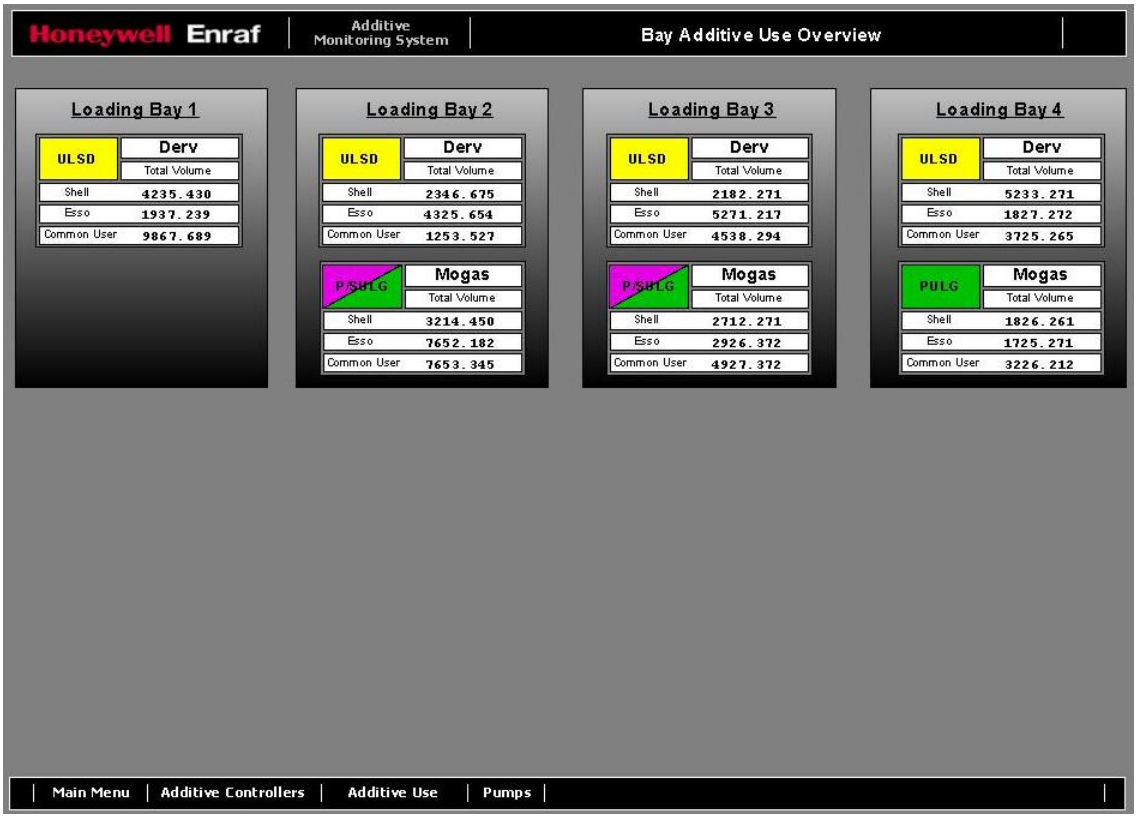
A trend pop-up window can be viewed for each additive. This shows a graph view and table history for the injected volume, flow meter volume, and deviation. Its can be a useful tool for checking additive volumes and deviation for any time in the past.

To open a trend pop-up click on the additive name on the additive use overview page, the following trend pop-up window appears:



The trend window period can be set from 1 minute up to 1 year, using the top right drop down box. By drawing over the trend graph with the mouse pointer, a zoom window can be made, allowing easy access to any time window in the past.

5.5 Bay Detail Page

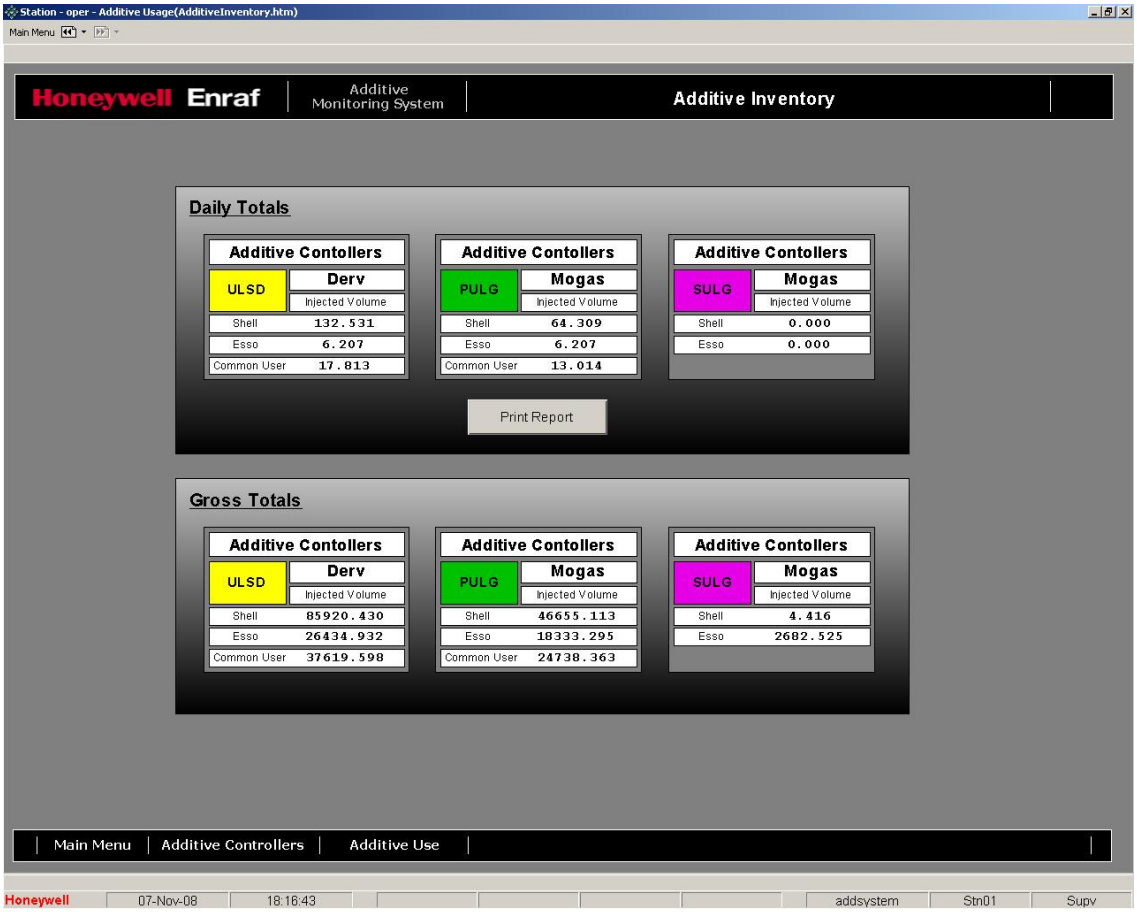


This page shows the gross total additive volumes for each loading bay.

Page navigation bar links:

- *Main Menu*
- *Additive Controllers overview*
- *Additive Use overview*
- *Pump status*

5.6 Additive Inventory



The additive inventory page shows a breakdown of each injected additive per product for inventory use.

As with the additive overview screen, there are two sections, daily totals which reset to zero at midnight, and a gross totals which never reset.

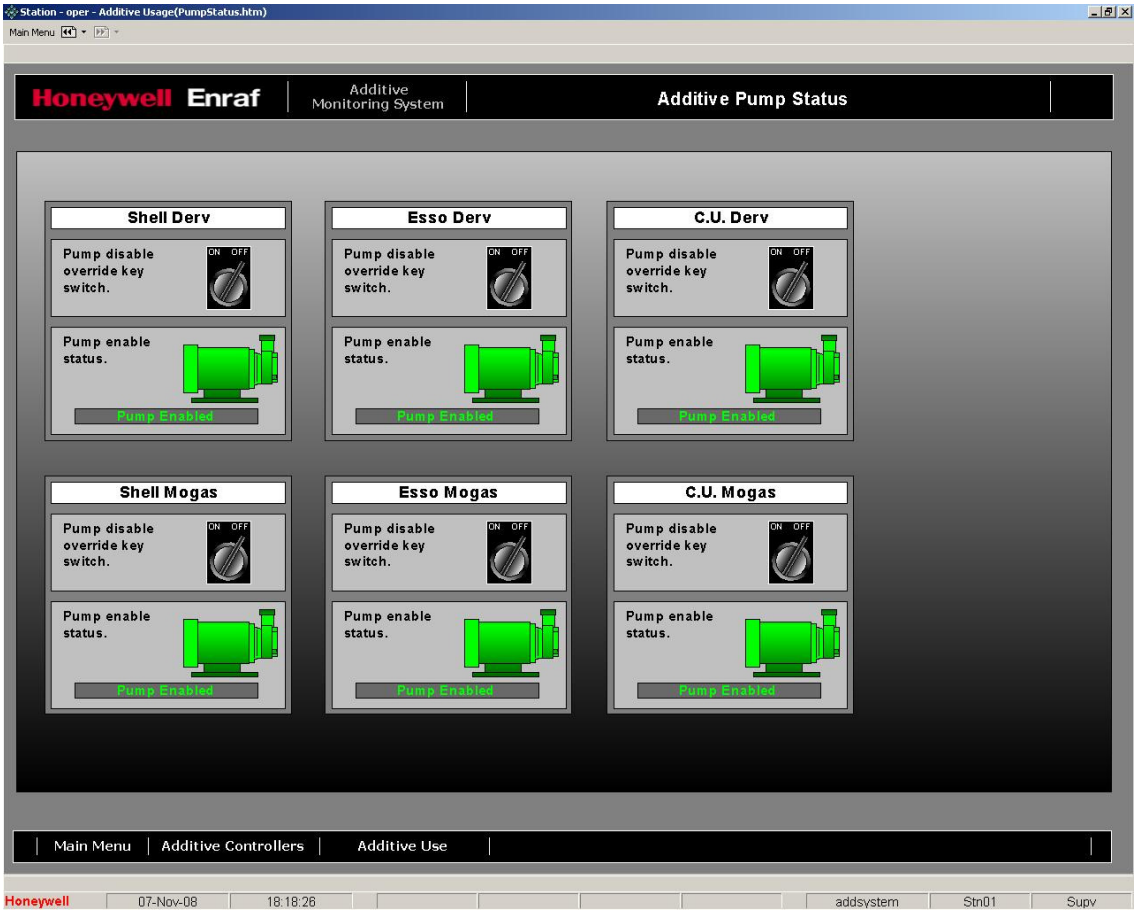
To print off the inventory report click the 'Print Report' button. Refer to section 7 form more on additive reports.

Page navigation bar links:

- *Main Menu*
- *Additive Controllers overview*
- *Additive Use overview*

6.0 Pump & System Status

6.1 Pump Status



The pump status page shows the enable status for each additive pump skid.

The pump graphic and status message box for each pump skid is green when enabled, and red when disabled.

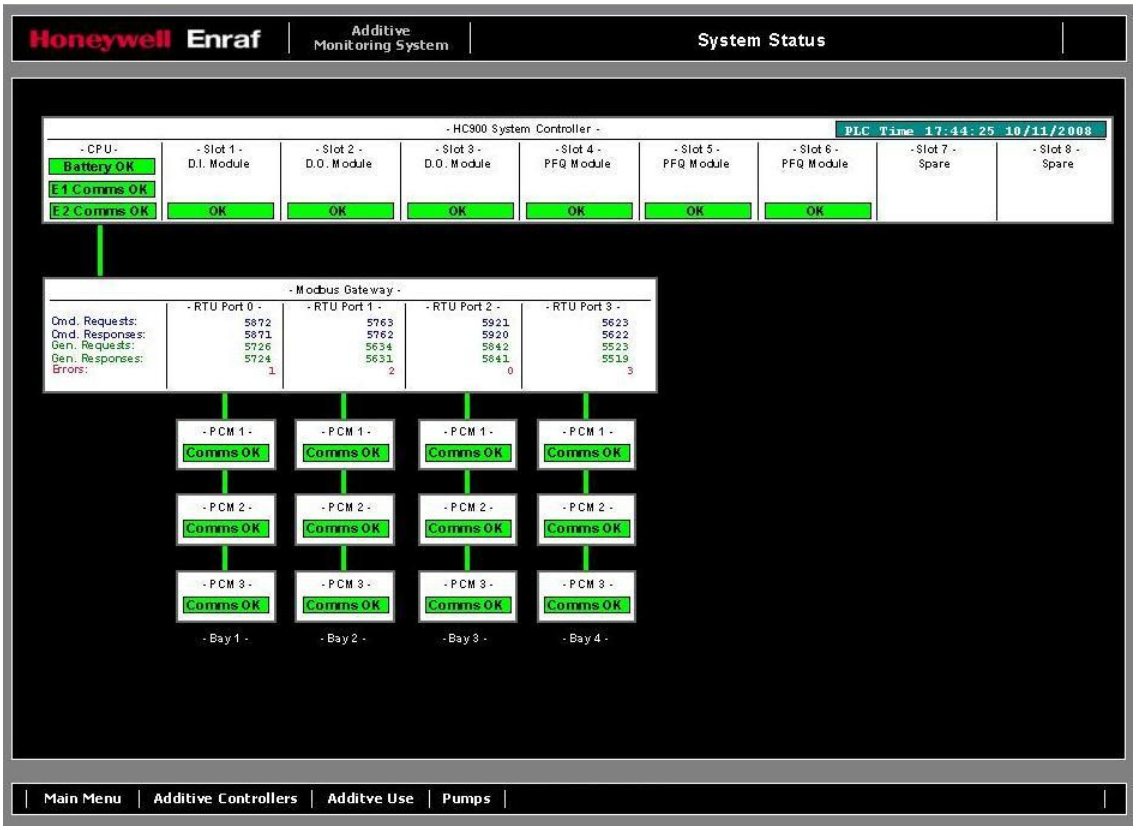
A disabled pump can be reset, by clicking on the pump. A confirmation dialog box then appears, click yes to reset the pump and related deviation.

The manual pump disable override key switches are also shown. These are hardwired key switches located inside the system control panel. These key switches override the pump disable function of the system, they are usually used for maintenance purposes. When a key switch is turned on, this is shown on the page above, a low severity alarm is triggered in the alarm viewer, and an alarm window is triggered on the control room annunciator.

Page navigation bar links:

- *Main Menu*
- *Additive Controllers overview*
- *Additive Use overview*

6.2 System Status


Honeywell Enraf
Additive Monitoring System
System Status
- HC900 System Controller -
PLC Time 17:44:25 10/11/2008
- CPU -
Battery OK
E1 Comms OK
E2 Comms OK
- Slot 1 - D.I. Module
- Slot 2 - D.O. Module
- Slot 3 - D.O. Module
- Slot 4 - PFQ Module
- Slot 5 - PFQ Module
- Slot 6 - PFQ Module
- Slot 7 - Spare
- Slot 8 - Spare
OK
- Modbus Gateway -
- RTU Port 0 -
- RTU Port 1 -
- RTU Port 2 -
- RTU Port 3 -
Cmd. Requests: 5872 5763 5921 5623
Cmd. Responses: 5871 5762 5920 5622
Gen. Requests: 5726 5634 5842 5523
Gen. Responses: 5724 5631 5841 5519
Errors: 1 2 0 3
- PCM 1 -
- PCM 2 -
- PCM 3 -
Comms OK
- Bay 1 -
- Bay 2 -
- Bay 3 -
- Bay 4 -
Main Menu
Additive Controllers
Additve Use
Pumps

This page shows diagnostic information for the system. The green status indicators turn red when a fault occurs, in which case you should contact Honeywell Enraf for support.

The HC900 controller is shown at the top with CPU status indicators (battery and network ports), and I/O status (ok or fault) for each I/O module installed.

Communications diagnostic counters are displayed for the additive controller comms gateway, and comms status for each additive controller on the loading bays are shown.

Page navigation bar links:

- *Main Menu*
- *Additive Controllers overview*
- *Additive Use overview*
- *Pump Status*

7.0 Additive Reports

Two types of additive reports are available, the additive deviation report (refer to section 5.1) and the additive inventory report (refer to section 5.6).

Both reports are configured in ASCII text format, to enable them to be interfaced to a site reporting system such as IMAC, via an RS232 connection.

A standard printer can also be used to print off the reports locally.

Both reports are automatically printed (and/or sent to the reporting system) at 23:59hrs every day. Before the daily values are reset to zero and 00:00hrs.

The reports can also be manually printed off using the 'Print Report' buttons on the related operator station pages (refer to sections 5.1 and 5.6).

7.1 Additive Deviation Report (example)

07-Nov-08 18:14:38 RPT001: Deviation : Demanded : Page 1

Additive Monitoring System

Deviation Report

Page 1 of 3

Shell

	Derv	Mogas
********** Gross Totals **********		
Injected Total:	85917.602 Lt	46658.121 Lt
Flow Total:	591.200 Lt	521.000 Lt
********** Todays Totals **********		
Injected Total:	256.594 Lt	133.410 Lt
Flow Total:	265.000 Lt	154.500 Lt
Deviation:	3.172 %	13.650 %

Additive Monitoring System - Deviation Report

Page 2 of 3

Esso

	Derv	Mogas
********** Gross Totals **********		
Injected Total:	26434.932 Lt	38133.074 Lt
Flow Total:	139.300 Lt	247.300 Lt
********** Todays Totals **********		
Injected Total:	41.176 Lt	77.828 Lt
Flow Total:	44.100 Lt	94.800 Lt
Deviation:	6.631 %	17.903 %

Additive Monitoring System - Deviation Report

Page 3 of 3

Common User

	Derv	Mogas
********** Gross Totals **********		
Injected Total:	37619.598 Lt	65990.039 Lt
Flow Total:	275.600 Lt	367.800 Lt
********** Todays Totals **********		
Injected Total:	75.613 Lt	125.211 Lt
Flow Total:	78.300 Lt	126.500 Lt
Deviation:	3.431 %	1.019 %

---------- End of Report ----------

7.2 Additive Inventory Report (example)

```
07-Nov-08  18:15:12 RPT003: Inventory :                    Demanded : Page    1


                          ================================
                             Additive Monitoring System
                          ================================

                         ==================================
                         Inventory Report - Injected Totals
                         ==================================



        ----
        Derv
        ----

        Shell ULSD:          129.703 Lt

        Esso ULSD:             6.207 Lt

        C.U. ULSD:            17.812 Lt


        -----
        Mogas
        -----

        Shell PULG:           62.898 Lt

        Esso PULG:             6.207 Lt

        C.U. PULG:            13.014 Lt


        Shell SULG:            0.000 Lt

        Esso SULG:             0.000 Lt



---------------------------------- End of Report ----------------------------------
```